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Volume 1

PROCEEDINGS of the  
16th ~~DOE~~ NUCLEAR AIR CLEANING CONFERENCE  
Held in San Diego, California  
20 - 23 October 1980

**Sponsors: U.S. Department of Energy  
The Harvard Air Cleaning Laboratory**

**Editor  
Melvin W. First**

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Melvin W. First  
Harvard Air Cleaning Laboratory

## FOREWORD

The Sixteenth DOE Nuclear Air Cleaning Conference was held Oct. 20-23, 1980, in San Diego, Calif. The 350 air cleaning specialists who attended were affiliated with governmental agencies, educational institutions, national laboratories, and many sectors of the nuclear industry, and included representatives from the United States and 11 foreign countries.

Major topics discussed during the conference were waste treatment, including volume reduction and storage, system and component response to stress and accident conditions, the Three Mile Island accident, iodine adsorption, the treatment and storage of noble gas, the treatment of offgases from chemical processing, aerosol behavior, containment venting, laboratory and in-place filter-testing methods, and particulate filtration. The conference focused on the exchange of information among the participants.

Air cleaning research is continuing to move forward in both the United States and foreign countries, yet there are distinct differences in the nature of these efforts. In the European countries, research efforts are directed toward air cleaning problems associated with the reprocessing of spent fuels. Foreign researchers are also expending considerable time and effort on remote changing and packaging of spent filter elements. Within the United States, research is moving forward on the development of filtered vented containment systems for commercial nuclear power plants, and the use of sand filters in the venting system is once again receiving attention.

The Three Mile Island accident of March 1979 and the associated air cleaning aspects were discussed at length and in detail during the conference. It is clear that this single event will have a profound influence on future nuclear safety developments, including engineered safety feature nuclear air and gas cleaning systems. This places a heavy responsibility on all air cleaning specialists to improve their systems, where needed, and to devise administrative mechanisms that will assure their constant readiness to perform in the expected manner should they be called upon again.

It was announced at the Conference that an author, title, and permutated work index to the Proceedings of all of the Nuclear Air Cleaning Conferences, including this 16th, would become available simultaneously with the Proceedings of the 16th Conference through the efforts of Mr. Clifford Burchsted and the Oak Ridge National Laboratory. This is welcome news to all nuclear air cleaning specialists as it makes a vast archive of information readily available for consultation, reference, and review.

Program Committee

DEDICATION  
OF PROCEEDINGS  
TO DR. MELVIN W. FIRST

For more than 30 years, Professor Melvin W. First of the Harvard School of Public Health has been a national Leader in the field of environmental health and safety. Since 1966, he has headed the Harvard Air Cleaning Laboratory and he has served as Chairman of the 9th through the 16th Nuclear Air Cleaning Conferences.

During the luncheon session at the 16th Conference, Dr. First was honored by his colleagues through the presentation to him of a special citation, plus a letter of commendation from Charles Duncan, Secretary of the U.S. Department of Energy (see pages which follow).

These Proceedings are dedicated to Dr. First by his colleagues, friends, and professional associates in honor of his inspiration and leadership in planning and convening the Nuclear Air Cleaning Conferences.

The Program Committee



Shown above is a photograph of Dr. First receiving one of several mementos presented to him during the luncheon session of the 16th Nuclear Air Cleaning Conference. Standing behind Dr. First is his wife, Julia. Making the presentation is Dr. Dade W. Moeller. Others in the photograph are Dr. Ronald Bellamy, seated beside Mrs. First, and Mr. Humphrey Gilbert, partially hidden behind the microphones. Special appreciation is extended to Dr. Yashuhiko Itoh of Nitta Belting Company, Ltd., Tokyo, who took the photograph.



THE SECRETARY OF ENERGY  
WASHINGTON, D.C. 20585

October 22, 1980

Dr. Melvin W. First  
Professor of Environmental Health Engineering  
and Director, Harvard Air Cleaning Laboratory  
School of Public Health  
Harvard University  
665 Huntington Avenue  
Boston, Massachusetts 02115

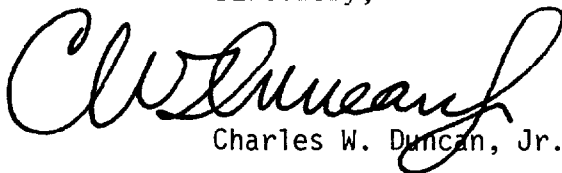
Dear Dr. First:

Having been informed that this is the last Air Cleaning Conference that you will chair prior to your retirement from the Harvard School of Public Health, I want to take this opportunity to extend to you our heartiest congratulations and to thank you for your many years of faithful service both to the U.S. Department of Energy and to your colleagues in the professional air cleaning community.

As Director of the Harvard Air Cleaning Laboratory, you have worked with the Department of Energy and its predecessor organizations for over 30 years. During that time, you have conducted research on containment systems for nuclear power plants, on cleanup systems for liquid metal fast breeder reactors, on adsorption systems for the removal of radioiodine and the noble gases, and on the development of new and better techniques for testing the performance of air cleaning systems. In addition, you have been the major catalyst in organizing and promoting this series of biennial Air Cleaning Conferences, of which this meeting is the sixteenth. The Proceedings of these Conferences, many of which you have personally compiled and edited, serve today as a veritable encyclopedia on the subject of air cleaning. As a note to the side, but of no little significance, I am told that you are one of the few, if not the only person, who has attended every air cleaning conference since the first one was held in Boston in June 1951.

Today, I join with my Department of Energy associates in saluting you for your many contributions and years of faithful service to your fellowman. At the same time, we look forward to your continuing involvement in air cleaning research and particularly in the conduct of conferences similar to this for many years to come.

Sincerely,

A handwritten signature in cursive script, reading "Charles W. Duncan, Jr.", is positioned above the printed name.

Charles W. Duncan, Jr.



This certificate is awarded

to

DR. MELVIN W. FIRST

for his thirty years of dedicated  
teaching and research, and for his  
inspiration and leadership in planning  
and convening the Nuclear Air Cleaning  
Conferences

Presented

at the

16th DOE Nuclear Air Cleaning Conference

San Diego, California

October 22, 1980

A handwritten signature in cursive script, reading "Charles Duncan".

Charles Duncan, Secretary  
U. S. Department of Energy

A handwritten signature in cursive script, reading "Derek Bok".

Derek Bok, President  
Harvard University

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Thursday: October 23, 1980

CHAIRMAN: John Collins  
Nuclear Regulatory Commission

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